

## CLAIMS

### What is claimed is:

1. A track jump apparatus for accessing an optical storage medium, which is applied for controlling track cross velocity and track position, comprising:
  - 5 an actuator unit for moving an objective lens in an optical pickup head which changes the position of light spot emitted from laser diode in the optical pickup head onto data tracks of the optical storage medium, thereby generating information corresponding to the data tracks;
  - a pre-amplifier for generating a tracking error signal and a focus sum signal  
10 according to the information corresponding to the data tracks;
  - a micro processor for providing a track jump command; and
  - a position control unit electrically coupled to the pre-amplifier and the micro processor, wherein when the position control unit does not receive the jump command, the laser spot output from the objective lens in the optical pickup head is  
15 positioned at the current track and the position control unit receives the tracking error signal in order to produce a control signal to control the position of the laser spot, and when the position control unit receives the jump command, the laser spot output from objective lens in optical pickup head moves from the current track to a object track, and the position control unit receives the tracking error signal and the focus sum  
20 signal to generate a control signal to control the track cross velocity and the position of the laser spot by means of actuator unit.
2. The track jump apparatus of claim 1, wherein the actuator unit is controlled by electric current.

3. The track jump apparatus of claim 2, wherein the track jump apparatus further comprises an actuator driver for transforming the control signal from voltage type to current type.
4. The track jump apparatus of claim 1, wherein the position control unit comprises:
  - 5 a hybrid track position detector for delivering a hybrid track position signal and an area changeover signal according to the tracking error signal and the focus sum signal;
  - 10 a position accumulator for computing the current accumulated hybrid track positions according to the hybrid track position signal and the area changeover signal, thereby delivering an accumulated hybrid track position signal;
  - a position profile generator and pull-in detector for generating an object position command signal and a pull-in signal according to the track jump command, wherein the object position command signal and the pull-in signal are necessary for moving the light spots of the laser beam from the current track to the object track;
  - 15 a subtractor for delivering a position error signal according to the accumulated hybrid track position signal and the object position command signal; and
  - a switching unit for receiving the tracking error signal or the position error signal according to the voltage level of the pull-in signal.
5. The track jump apparatus of claim 4, wherein the position control unit further  
20 comprises a compensator for delivering the control signal to the actuator driver.
6. The track jump apparatus of claim 4, wherein the hybrid track position detector comprises:
  - a register file for storing the corresponding parameters for computing hybrid

track position; and

a hybrid track position calculator for delivering the hybrid track position signal and the area changeover signal according to a normalized tracking error signal, a normalized focus sum signal, and the parameters.

- 5     7. The track jump apparatus of claim 6, wherein the hybrid track position detector further comprises:

a first gain calculator, for computing a gain value which is necessary for normalizing a tracking error signal according to a offset of the tracking error signal, and a maximum value and a minimum value of the tracking error signal;

- 10         a second gain calculator, for computing a gain value which is necessary for normalizing a focus sum signal according to a offset of the focus sum signal, and a maximum value and a minimum value of the focus sum signal;

- 15         a first gain compensator, for delivering the normalized tracking error signal according to the gain value of the tracking error signal and an offset compensated tracking error signal; and

a second gain compensator, for delivering the normalized focus sum signal according to the gain value of the focus sum signal and an offset compensated focus sum signal.

- 20     8. The track jump apparatus of claim 7, wherein the hybrid track position detector further comprises:

a first peak detector for detecting the maximum and the minimum of the tracking error signal;

a second peak detector for detecting the maximum and the minimum of the

focus sum signal;

a first offset detector for delivering the offset of the tracking error signal according to the tracking error signal; and

5 a second offset detector for delivering the offset of the focus sum signal according to the focus sum signal.

9. The track jump apparatus of claim 7, wherein the track position detector further comprises:

a first offset compensator for delivering the offset compensated tracking error signal according to the offset of the tracking error signal; and

10 a second offset compensator for delivering the offset compensated focus sum signal according to the offset of the focus sum signal.

10. The track jump apparatus of claim 4, wherein the area changeover signal is delivered when the relation of the normalized tracking error signal and the normalized focus sum signal is linear.

15 11. A position detection method for a track jump apparatus which accesses an optical storage medium, which method is applied for controlling track cross velocity and track position, wherein the apparatus comprises an optical pickup head to project light spots on data tracks of the optical storage medium, thereby generating information corresponding to the data tracks, the method comprising the steps of:

20 outputting a tracking error signal and a focus sum signal by a pre-amplifier according to the information corresponding to the data tracks, thereby delivering a hybrid track position signal and an area changeover signal by a hybrid track position detector;

providing a track jump command by a micro processor, and outputting an object position command signal and a pull-in signal according to the track jump command;

outputting an accumulated hybrid track position signal according to the object position command signal and the area changeover signal;

5           outputting a position error signal according to the accumulated hybrid track position signal and the object position command signal; and

outputting a control signal for controlling the track cross velocity of the laser spot emitted from optical pickup head by a compensator according to the voltage level of the pull-in signal.

10    12. The position detection method for a track jump apparatus of claim 11, wherein the step of delivering a hybrid track position signal and an area changeover signal further comprises steps of:

obtaining an offset value, a maximum value and a minimum value according to the tracking error signal;

15           obtaining an offset value, a maximum value and a minimum value according to the focus sum signal;

outputting a gain value according to the offset value, the maximum value and the minimum value according to the tracking error signal;

20           outputting a gain value according to the offset value, the maximum value and the minimum value according to the focus sum signal;

outputting a normalized tracking error signal according to the gain value and the offset of the tracking error signal; and

outputting a normalized focus sum signal according to the gain value and the

offset of the focus sum signal.

13. The position detection method for a track jump apparatus of claim 12, wherein the area changeover signal is delivered when the relation of the normalized tracking error signal and the normalized focus sum signal is linear.